still await their final volume, which is to contain all of Cauchy's pamphlets and lithographs.

3) Page 988 contains some doubtful remarks concerning Dedekind and Peano. Dedekind's *Was sind und was sollen die Zahlen?* was only first-drafted during 1872–1878, and it attracted far more interest after its publication in 1887 than Kline allows. But, as opposed to the claim often made elsewhere and repeated here, it does not seem to have been used by Peano when writing his 1889 *Arithmetices Principia*, for in a later paper Peano said quite explicitly that his pamphlet had been prepared independently of Dedekind's.

4) Kline discusses at length Cantor's theory of real numbers (pp. 984–85), but he overlooks the difficulty in Cantor's theory of interpreting the equality of two numbers defined by different fundamental sequences. Later he misrepresents Cantor's second number class (p. 1001), giving it a last term. He also asserts that Klein "was by no means in sympathy" with Cantor's ideas (p. 1003), whereas Klein had Cantor's papers published in *Mathematische Annalen* after the opposition from Kronecker.

5) Kline's discussion of Russell's theory of types merges its "simple" and "ramified" parts (p. 1195) and so renders enigmatic the remarks on the axiom of reducibility. The discussion following of the construction of mathematics by logicist means omits mention of ordering and relation arithmetic, whose techniques are vital to such developments.

6) The discussion of measure and its applications (chapter 44) astonishingly ignores W. H. and G. C. Young, who did as much as anyone in this area.

One could continue in this vein; but nothing can, or should, dispel the fine impression that this book leaves. I am still amazed by the amount that Kline has achieved.

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Lore of an Element

Mercury. A History of Quicksilver. LEONARD J. GOLDWATER. York, Baltimore, 1972. xiv, 318 pp., illus. $15.

Is this the first case history of a chemical element? Quite possibly. It sets a pattern worthy of emulation for each of the other elements. However, few elements have been of such fascination to man over so many centuries as has mercury, liquid yet with the mysterious properties of metals. Chinese alchemists in the fourth century prescribed cinnabar, red mercuric sulfide, as the elixir for attainment of immortality. In later eras mercury in the ear was a method of murder—suggesting a possible cause of death of Hamlet's father. Mercury it seems even when swallowed in amazingly large quantities often passes through the system with little harm. Yet mercury breathed or mercury in the blood has awful consequences. Mercury was one of the three elements (the others being sulfur and salt) of which all substances were believed by Paracelsus and others to be constituted. It even had a planet named after it. It played a major role in the battle against syphilis and still there is disagreement whether treatment did more harm or good. All this and much more is contained in this book, including the questioning of one thing we did think we knew! Was Alice's Mad Hatter afflicted with the "hatter's shakes," the occupational disease of the felting industry, in which mercury compounds were used, or was "mad as a hatter" a corruption of "mad as an adder"?

Here is a work of broad-ranging scholarship delving into the earliest discovery and the uses of mercury in every corner of the globe. Part 1 deals with aspects of mercury other than its effects in man, tracing the history of its use in the occult arts, its extraction, its importance in trade and finance, and knowledge and use of it through the ages, including its role in chemistry and its uses in scientific instruments. Part 2, the medical aspects, represents the author's special field, for he was studying the hat industry in 1936, was involved in World Health Organization studies of mercury, lead, and arsenic pollution in 1956 (ten years before the public alarm), and has been developing analytical procedures for large-scale human studies.

The book carries extensive lists of references, though unfortunately they are not always specific, occasionally omitting page numbers. One piece of mercury lore not found in the book would interest the author and maybe others. Spinach is reported to have been used by the early Chinese as an antidote against mercury poisoning no doubt produced by their attempts to become immortal (E. H. Shafer, *The Golden Peaches of Samarkand*, University of California Press, 1963, p. 147). Is the oxalate in spinach responsible for the removal of mercury?

This is an absorbing book of interest to a wide range of readers. Historians, teachers, ecologists, researchers dealing with mercury (and who doesn't?), doctors, dentists, and investigators of occupational diseases all will find material to ponder or to be amused by.

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Health Care and Social Policy

The Case for American Medicine. A Realistic Look at Our Health Care System. HARRY SCHWARTZ. McKay, New York, 1972. xiv, 240 pp. $6.95.

The American Medical Machine. ABRAHAM RIBICOFF, with Paul Danaceau. Saturday Review Press, New York, 1972. vii, 212 pp. $6.95.

Health Care: Can There Be Equity? The United States, Sweden, and England. ODIN W. ANDERSON. Wiley, New York, 1972. xxii, 274 pp., illus. $11.95.

The movement toward an improved health care system in America proceeds haltingly but persistently. It is a centipedic movement and its forward pace is sometimes hampered by separate limbs reaching in different directions. Sometimes there seems to be no motion at all.

Impetus for the movement comes from many sources, some internal and others external to the system. Advances in biomedical science constantly challenge medical practitioners to alter treatment practices. A range of personal and professional reasons contribute to a discernible trend toward multi-specialty group practice and away from solo practice, and to a related if somewhat vaguer attention to preventive care. Demonstrated needs occasionally prompt new governmental policies aimed at eliminating severe medical hardships for special groups of citizens. High costs of medical care bring popular cries for controls, or at least for financial help. Politicians recognize the citizenry's continuing preoccupation with health, and are prop-

erly inspired to propose structural or procedural changes in the way medical care is delivered and financed. Doctors, economists, and policy analysts propose their own innovations. New sociopolitical concepts sometimes gain acceptance and add impetus to the movement; for example, more and more people seem to accept the principle that unimpeded access to good medical care is tantamount to a civil right. More broadly, concern about equity prods the health care system from various sides, and the felt need for eternal progress lends additional forward weight.

Periodically, a sufficient number of such elements aggregate into what seems to be a crisis. At present, perceptions of a health crisis hover in several sectors of the national mentality. Total conviction is lacking, however; for most Americans, the crisis derives more from the judgments and ascriptions of others than from their personal experiences. And just as some policy makers recognize that it will probably take a crisis to permit them to become agents of change, so some observers of the policy process (whether or not they themselves favor change) recognize that crisis can be manipulated conceptually as well as occur naturally.

In the light of U.S. constitutional history, it is understandable that crisis should be the basis for significant new departures in governmental policy. It is nonetheless unfortunate, because of what the crisis syndrome often does to the quality of public debate and can do to its outcome, and because in recent times people have become understandably weary of dire warnings. We are, as Douglas DeNike has written, an "overwarned society," admonished and exhorted about so many "highly threatening possibilities" that "their very threat value may cause them to be rejected." Perhaps this is one reason why, at this particular moment, the movement toward an improved health care system in the United States seems to be stalled.

It is not, however, out of concern about the counterproductive effects of crisis rhetoric that Harry Schwartz, an editorial writer for the *New York Times* as well as an academic, has marshaled *The Case for American Medicine*. He clearly believes that neither a crisis nor even any serious problems exist in American health care, and is therefore skeptical of widely touted proposals for improving it. Indeed, for Schwartz, the health care system we have is the world's best, and American doctors are in the front ranks of history's heroes.

Amidst the pervasive arguments to the contrary, Schwartz's defense of American medicine comes almost as a relief. It is high time that an intelligent and presumably objective spokesman challenged those zealous advocates of change whose arguments largely consist of a recitation of horror stories and a damnation of villains. There is no reason why the estimate of a current doctor shortage of 50,000 should not be questioned, as it is by Schwartz, even though most experienced analysts accept it. It is pertinent to examine critically, as the author does, available examples of health maintenance organizations (HMO's) before the federal government spawns a string of them across the country. And it is very useful to compare infant mortality rates in several countries not only in rough totals as is usually done but, among other ways, according to population densities; on such a basis it may be reassuring to some that the infant mortality rate of New York City is about the same as that of Moscow and Leningrad.

The evidence the author adduces that most Americans are satisfied with the medical care they receive is relevant to the case at hand. Schwartz is also right not to let us ignore the technological marvels of which American medicine is capable, for exotic as they may sometimes seem they are now saving thousands of lives. Further, it may well be an illusion, as some believe, that changes in the health care system will greatly improve the nation's health, which may be more affected by diet, housing, atmospheric conditions, and education than by medical treatment; in any event, Schwartz properly reminds us that it is unreasonable to look to American medicine to be the principal ensurer of national good health.

All these important points the author, who is an admirable journalist, makes in an always lively and a sometimes persuasive way. Yet, in the end, his case as a whole is less than convincing. In his role of counsel for the defense, Schwartz extends his arguments so far that he strains our credibility. Not content simply to show that American medicine is not guilty of the most serious charges against it, he strives to convince us that in fact the defendant is a paragon of virtue, a model of efficiency and justice, and the last best hope, even in its present state, of the sick and fevered everywhere. At times his defense of doctors almost becomes an attack on patients: "Patient pressure" is what produces unnecessary hospital stays, hence drives costs up; physicians who seek to exercise restraint in providing costly medical care (covered by medical insurance) risk antagonizing their patients and "losing their patronage to other doctors who are more willing to let 'free' medical care be exploited generously" (pp. 13–14).

It is of course true that private health insurance is primarily hospital insurance, and doctors therefore sometimes have their patients admitted to hospitals for tests or treatment that could be administered on an outpatient basis. But Schwartz argues in another place that extending insurance to cover ambulatory care costs would in fact drive up health service utilization rates, hence costs, even more (pp. 119–20). In any case, the fact is that the doctor, not the patient, controls decisions about hospital admissions and the nature and length of treatment. If doctors make medical decisions on the basis of patient pressures, then they are not the pristine, pure professionals Schwartz would make them out to be, are they?

Not until page 222 of this 228-page book does the author suggest he has not meant to imply that "American medicine is perfect, that the status quo must be preserved intact, or that improvement is impossible." He does, in the concluding pages, recommend certain improvements in two aspects of American medicine:

1) The high cost of treatment: Federal price controls have diminished this problem, and presumably could be kept, or dropped and later reinstated if necessary; "as for doctors' fees, the rapid increase in the number of physicians entering practice in this country should provide useful assistance for those concerned with restraining price increases for medical services." Meanwhile, funding a system of catastrophic medical insurance, with "limits to prevent expensive abuses," is a not unreasonable step for the federal government to take.

2) Geographic and specialty maldistribution: Training programs in specialties where there is a surplus of doctors should be drastically reduced; financial incentives should be offered to correct imbalances. The number of Neighborhood Health Centers should

be increased. And "the medical profession might designate certain geographic areas that are best supplied with physicians as 'areas of doctor surplus' and attempt to discourage other physicians from moving into the surplus areas for some periods of time."

Obviously, Schwartz's book will please physicians, and it may reassure many laymen who have been wondering whether, as they have so often heard, the British and the Swedes and those who belong to HMO's are much better off than the rest of us when it comes to medical care. But to the policy makers and their counselors who are now struggling to resolve tough, specific issues in the right way, *The Case for American Medicine* may seem to be a case of underdeveloped analysis and rhetorical overkill.

In a way, Schwartz simply comes to the policy arena a little too late. Few major conclusions have been reached as yet, but there seems to be a new mood on Capitol Hill about legislation which would alter the health care system, a mood of moderation and of temperate expectations. That mood is expressed in one way by Abraham Ribicoff, the liberal Senator from Connecticut and former Secretary of Health, Education, and Welfare, who in his book with Paul Danaceau straightforwardly acknowledges (chapter 6) the limitations and uncertainty of governmental policy making. Further, he has specific doubts about whether any national health insurance program totally controlled by a central bureaucracy (the kind of plan Schwartz is apparently fearful Congress is on the verge of enacting) will work. Ribicoff is convinced that universal national health insurance is needed, and he has his own ideas about how it might be developed (federal funding with state administration). His fundamental concern, however, is to try to make the present health care system more equitable. He sees medical care as a right to be enjoyed by all citizens, but he recognizes that there is a long distance between the assertion of that right and the devising of policies and programs and the acceptance of practices likely to ensure it. Effectuating the right to medical care "is a complex and awesome task." Reading this book and similar signs, one gets the distinct feeling that the policy makers and the people are still open to policy alternatives, including some not yet advanced, if their proponents can persuasively demonstrate a high probability of their being equitable and efficacious.

Comparative analysis is one way to go about such a demonstration. In *Health Care: Can There Be Equity?*, the latest of his series of thoughtful examinations of various aspects of health care, Odin W. Anderson provides a comparative analysis of medical care systems in Sweden, England, and the United States. Anderson has been compiling data on the three systems for a number of years, and has been able to fill gaps that understanding based only on statistics always leaves, by spending time in the two European countries. (Schwartz also visited Sweden and England, and the results of his interviews add a complementary piquancy to Anderson's drier mix of fact and perspectives.)

If, as is often pointed out, there are good reasons why health status and the health care systems of Sweden and England are not comparable to the U.S. situation, there are nonetheless good reasons for looking simultaneously at the experiences of the three countries. All are "Western liberal democracies characterized by autonomous interest groups, mixed economies, and representative forms of government," and "dissatisfaction with the current operation of the health services in all of the three countries is mounting, varying only in intensity."

The broad differences in the English and American approaches to health care are relatively familiar. In Great Britain the whole population has virtually free access to health services; the central government owns and operates the hospital system; and 85 percent of all medical care costs are paid by the national government. The British system, in sum, is highly structured and centrally directed. The U.S. system is loose and varied, but is dominated by private medical practitioners and nongovernmental, nonprofit hospitals; 62 percent of all medical care costs are paid by the private sector and 38 percent by all levels of government. In Sweden, county governments have a primary role, with counties and municipalities operating the hospitals, in which medical specialists retained by the government hold sway. There are many private general practitioners as well, but they are reimbursed for their services primarily according to standard rates from the government-subsidized health insurance system.

Such differences, Anderson shows, are in many ways the product of different cultural and political heritages. I do an injustice to his detailed account of the historical evolution of English concepts of social justice to reduce it to such shorthand; but Anderson suggests that in adopting a system of universal health coverage, the British merely recognized the destratification of social and economic groups in their society, and translated the paternal responsibility once assumed by the aristocrats for the health of the poor into a national governmental responsibility for all citizens. In America there have been charity hospitals for the destitute from the time when we too were Englishmen, but ours has mainly been a system wherein each person, or family, has been expected to pay his own way, even for needed medical attention. The voluntary pooling of resources to help defray such expenses, as in the early cooperative insurance plans of craft unions and other organizations, developed as a natural complement to self-sufficiency. Reliance on government for help, even if only to coordinate the pooling of private resources (as in the Social Security system), has until recent times always been an extreme resort. On the other hand, one of the valuable lessons to be learned from Anderson is that, in the long run of history, the United States has not been greatly out of step with other Western democracies in developing operational definitions of social justice or in implementing them.

There is no reason, of course, to expect that the United States will or should follow the contours of the British or Swedish health care models in attempting to improve on our own. No reason, that is, unless it is clear that (i) our British and Swedish counterparts enjoy better health because of their medical care systems or that (ii) those systems are more equitable in ensuring the provision of good medical care, whatever the effects on overall health status, to any who need it. It is on these matters that Anderson's effort ought to provide the most useful information, for he set out to identify "quantifiable indicators" that would serve as reference points on costs, use, and health results of each system. Alas, the difficulties of measuring need, demand, and outcome in the health field proved to be great. All his tri-country comparisons—of facilities and medical and allied professionals, in national

totals and as distributed across varying population densities; of treatment patterns and facility utilization; of costs of health care, per unit, in the aggregate, and as percentages of national income; and of morbidity and mortality rates—only lead the author to very general conclusions. Example: "The conclusion is suggested that the dominant reason why the Swedish mortality rates are lower than in any state in the United States is a high minimum standard of living for everyone and a cultural homogeneity of life styles of sanitation and cleanliness."

Such a conclusion, broad though it is, is not without implications for social policy. Anderson, like Schwartz, suggests that "the elimination of poverty in the United States in the sense true for Sweden would be more likely to bring mortality rates closer to Sweden than a policy limited to health services only." I do not know anyone who would argue that point. But it seems to me that, after ginning up a wealth of information which would permit a tentative answer, the author begs the question he poses in his title. Or at least he does not gather the evidence scattered throughout the book into a pertinent conclusion.

Anderson finds, not surprisingly, that none of the three systems is perfectly equitable; nor, he stresses, can any medical care system provide "equality of access in its pure form." Thus the search for a better system goes forward in Sweden and England as well as in the United States. Meanwhile: (i) The lower fetal and infant mortality rates in Sweden and England are undoubtedly related to the "more coordinated, easily accessible care" available in those countries (pp. 149–150). (ii) The difference in mortality rates, which are higher in the United States at every age level (and affected shamefully by higher rates among blacks than among whites), is "probably too great to be explained by social conditions and undoubtedly reflects an actual difference in available care" (p. 151). (iii) "Income-class differences were generally found in the United States but not in Sweden for physician services and drugs" (p. 159). And (iv) the U.S. system provides far less protection of "family financial solvency" in the event of medical need than do the other two countries (p. 160).

Thus whether there can ever be perfect equity, or perfect efficacy, Anderson seems to have found that two other health care systems have certain advantages over ours. They also have their debits, as Anderson also shows, and the United States has strengths that few people would want to give up. In the end, we must devise our own improvements. May the movement continue with all due speed.

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